

**FUNDAMENTALS OF
SOUTH INDIAN OR KARNATIC
MUSIC IN A NUTSHELL**

RAMAKRISHNAN (E. M.)

30K

MATERIA MUSICA

**FUNDAMENTALS
OF
SOUTH INDIAN OR KARNATIC MUSIC
IN A NUTSHELL**

By

Isai Kalaimani, Vidwan

E. M. RAMAKRISHNAN

Composer-Director-Teacher of Indian music (for the musical broadcast productions of) Lutheran Centre, Madras, 1954 to 1966.

Jalatharangam-Musician, Gemini Studios, Madras, 1942 to 1957.

Music-Maker for certain Indian Documentary Films, 1956 - 1958.

Guest artist for Jalatharangam to the New York Little Orchestra for the world premiere of HENRY COWELL's Thirteenth Symphony (Madras Symphony) under the direction of THOMAS SCHERMAN, in Madras, 1959.



[ALL RIGHTS RESERVED]

MADRAS

1967

PERUSABLES

From

Prof. P. SAMBAMOORTHY,

Head of the Department of Indian Music, University of Madras
and Director of Sangita Vadyalaya, Madras:

President, Faculty of Fine Arts, University of Madras.

Government of India

Ministry of Commerce and Industry

All India Handicrafts Board,

SANGITA VADYALAYA

(Development Centre for Musical Instruments)

Annamalai Manram

Esplanade, Madras-1.

Date 22nd July '63

CERTIFICATE

I know Sri Vidwan E.M. Ramakrishnan
for a long time. He is a good musician
and plays on the Jalatharangam.

(Sd.) *P. Sambamoorthi*
Director.

From

B. W. CHELLADURAI,

Chairman, Executive Committee, Office Co-ordinator,
Audience Relations Officer, Lutheran Centre, Madras-34.

THE LUTHERAN CENTRE

3, Nungambakkam High Road, Madras-34.

Tele 88627

Telegrams "LURELIEF"

TO WHOM IT MAY CONCERN

Mr. E. M. Ramakrishnan who has worked in this institution as Music Composer for the past several years retired from service on 9th September, '66. He is very proficient in Carnatic music and has composed original music to about 300 Lyrics. He is good at classical and light music as well.

He is a brilliant Jalatharangam player. He also plays several other instruments. He has been an asset to this institution and has contributed a great deal to the development of religious and secular music.

I wish him all happiness and God's blessings in the days to come.

(Sd.) *B. W. Chelladurai*

Chairman,

Executive Committee.

19th Sep '66

EXTRACT

From

THE MAIL dated

'September 20, 1966, Page 3

Isai Kalaimani

MADRAS, Sept. 20: The title of "Isai Kalaimani" was conferred on Vidwan E. M. Ramakrishnan. Music Composer by the Lutheran Centre, Nungambakkam, at a function got up to bid farewell to Mr. Ramakrishnan on his retirement from service.

From

HENRY COWELL,

A great music-composer whose Thirteenth Symphony (Madras Symphony) was premiered by The New York Little Orchestra under the direction of THOMAS SCHERMAN, in Madras in 1959.

Mr. E. M. Ramakrishnan
Madras 17, India

Shady, N.Y. U.S.A.
May 24th, 1959

Dear Mr. Ramakrishnan:

May I offer my thanks to you for your splendid playing of the Jalatarang part in my Thirteenth Symphony? I have heard the record, and enjoyed your performance very much indeed. It is good of you to have taken the time and effort to have done this, and it is very deeply appreciated.

Sincerely,

(Sd.) *Henry Cowell*

CONTENTS

PREFACE	...	
RHYTHM	...	1
MELODY	...	31
CONCLUSION	...	48



NOTA BENE

Read Thamizh for "Tamizh" in line 16 on page 1

Read parts of the for "partso fthe" just above the Chart on page 28

P R E F A C E

I have written in a nutshell this book on music for those interested in but require brief and simple tuition on the fundamentals of South Indian or Karnatic music. The essential materials presented in this book in response to the pressing requests from several students, friends and institutions are the result of my amateur musical experience during my academical years in the Madras Presidency and Christian Colleges, 1926 to 1930 (the year 1930 diverted me from the B.A. class), and of years of practical experience as a professional performer (on *Jalatharangam* or Water-bowls Organ), teacher, composer and director of South Indian or Karnatic (also allied) music.

The aim of this book is to serve the educational, scholastic and cultural purposes and to interestingly impart some knowledge of the fundamentals of South Indian or Karnatic music in those who wish to know something of why and how of it and who are anxious to become genuine performers of the same.

I have designed this book with appropriate charts to make understanding most easy for the *inlanders* and *foreigners* alike.

Materla Musica, is the general title with the symbol *Sakaraa* borne by every one of my books on music including this.

Any unauthorised copying, reproducing or translating of this book in any manner whatsoever is strictly forbidden. Written permission should be duly obtained from the author or his heirs for the same.

My sincere thanks are due to my daughters who encouraged and assisted me in fair-writing my manuscripts and correcting the typescripts.

The co-operation of the proprietor and the staff of Dynamic Printers, Madras-18, in carrying out the printing of this book from my typescripts deserves praise.

With best wishes,

14, Thyagaroya Gramani Street,
North Thyagaroya Nagar,
MADRAS - 17.

E. M. Ramakrishnan

18-3-1967

ERRATA etc.

1. For European tone-names on pages 34 & 47 spell and order the European Solfa-syllables for the Indian and European Solfa-letters as under.

Indian Solfa-letters	{	Sa	Re	Ga	Ma	Pa	Dha	Ni
European — „ —	{	C	D	E	F	G	A	B
European Solfa-syllables	{	Do	Re	Mi	Fa	Sol	La	Si
		or				or		or
		Ut				So		Ti

2. Solfaism and Solmisation are Solfa-singing.
 Sol-Fa is Pa-Ma or G-F, consonances to Sa or C; and
 Sol-Mi is Pa-Ga or G-E, a harmony.

The Indian Solfa-singing is also rhythmic.

RHYTHM

Rhythm - Cycle or THAALAM

Rhythm is movement with regular succession. It precedes melody in music. Rhythm is the regulating and shaping factor giving stability, form and colour to melody.

The South Indian Rhythms are more than twenty times as many as those of the other countries. The rhythmic wealth of Indian music is so much that it is incomparable to the other musical systems of the world.

The South Indian or Karnatic Rhythm-Cycle or Recurring Time-Measure is called *Thaalam*, *Aavariham* or *Aavarthanam*. The word *Thaalam* might be a derivative of the Latin word *Tulus* meaning counting which should have come through the Greeks who came to India during the ancient days or it might be a coined word of the two initial syllables *Taa* and *Laa* of *Ihaandavam* and *Laasyam* which are the masculine and feminine dances involving rhythms in South India. *Thookkoo* is the ancient *Tamizh* name for Rhythm-Cycle or Recurring Time-Measure.

The *Thaalam* is reckoned fundamentally with rhythm-mark called *Beat*, *Aksharam* or *Akkaram*. The *Beat* is the fundamental basis of rhythmic organisation and helps to constitute a *Thaalam*. For the constitution of a *Thaalam*, two beats are the minimum.

Colloquially, a beat may be a Hand-clap called *Ka Thattoo* which is an audible beat, a Hand-wave called *Visarjitham* which is a silent beat, a Palm-tap called *Anudhrutham* which is an audible beat, a Digital reckoning meaning finger-counting called *Viral Ennal* which is a silent beat and sometimes even a foot stamp called *Paadha Thattoo* which is an audible beat and so on.

The Beats of a *Thaalam* are homogeneous (of the same kind) in duration of time unless the homogeneity is wilfully altered or unless the *Beats* belong to a syncopated rhythm.

A *Beat* has for its foundational unit the *Count* which is the smallest unit for reckoning a *Thaalam*. While a *Beat* is constant in its duration of time, the *Counts* in it may be either constant or variant with relative durations of time (speeds) in number.

Thus while the *Count* constitutes the *Beat*, the *Beat* (however performed) constitutes the *Thaalam* or *Rhythm-Cycle*. In a *Thaalam*, a beat of the Palm-tap (a constant number of one beat) constitutes the part of an *Anudhrutham*, a beat of the Palm-tap and a following beat of the Hand-wave (a constant number of two homogeneous or the same kind of beats) constitute the part of a *Dhrutham* while a beat of the Palm-tap and the following as many beats of the Digital reckoning as are required (a variant number of homogeneous or the same kind of beats) constitute the part of a *Lagu* in a *Thaalam*.

A *Lagu* either by itself or as the largest part in association with other parts constitutes a *Thaalam*.

A *Thaalam* is divided in numerical terms of its beats in whatever manner the beats are performed.

Parts of a THAALAM

(of which the Lagu is a part in association with other, parts but by itself is a whole).

S. No.	Parts of Angams.	What the part is	How performed (Usually with the right hand)	Symbolically represented by	Period of the part in terms of:		Acoustic kind of beats	Numerical kind of beats
					<i>Maa-thirai</i> Unit of 4 beats	No. of beats		
1.	<i>Anudhrutham</i> No plurality of this part in a Thaalam.	A Palh-tap	Tapping of palm (usually on the thigh while squatting.)	—	$\frac{1}{4}$ M	1	Audible one	Constant.
2.	<i>Dhrutham</i> Dhruthams in a Thaalam are homogeneous or of the same kind	A Palm-tap followed by a hand-wave (Visarjitham)	Tapping of palm followed by a waving of hand upturned	○	$\frac{1}{2}$ M	2	Audible one followed by a silent one	Constant

3.	<i>Lagu</i> Lagus in a Thaalam are homogeneous or of the same kind. A Lagu by itself is a Thaalam.	A Palm-tap followed by Digital reckoning	Tapping of palm and without removing the tapped palm, counting from the little finger onwards towards the thumb with as many fingers raised and dropped as are required.	1	3M or more	3 or more	Audible one followed by as many silent ones as are required	Variable
4	<i>Gooroo</i>	Equals 2 Lagus of 4 beats each	Reckoning with units of maathirais or Lagus of 4 beats each in different manners.	8	2M	8	Audible as well as silent ones.	Constant
5.	<i>Plootham</i>	Equals 3 Lagus of 4 beats each.	„	8	3M	12		Constant
6.	<i>Kaakapaadham</i>	Equals 4 Lagus of 4 beats each.	„	+	4M	16		Constant

Although the above 6 parts of a Thaalam are found in the classic Thaalam of the ancient and other later musical works of South India, only the first 3 parts of them are taken for the constitution of the South Indian or Karnatic 7 Principal Thaalam, *Rhythm-Cycles* or *Recurring Time-mesasures*. The mode of constitution of these Thaalam gives them their characteristic features as given below :

Mode of Constitution (with Symbolic representations) of the

7 PRINCIPAL THALAMS

No.	Names of the 7 Principal Thaalam	Respective parts or features of the 7 Principal Thaalam in order	Symbolic representation
1.	DHRUVA	Has a Lagu, a Dhrutham and 2 Lagus	1011
2.	MATYA	Has a Lagu, a Dhrutham and a Lagu	101
3.	ROOPAKA	Has a Dhrutham and a Lagu	01
4.	JHAMPAI	Has a Lagu, an Anudhrutham and a Dhrutham.	1 — 0
5.	THIRI- POOTAI	Has a Lagu and 2 Dhruthams.	100
6.	ATA	Has 2 Lagus and 2 Dhrutham	1100
7.	EKA	Has a Lagu	1

Regarding the above Thaalam it is to be borne in mind that while Anudhrutham has no plurality in any of the Thaalam, plurality of any part like the Lagu or Dhrutham in a Thaalam has homogeneity (the same kind) and that also any part of a Thaalam other than the Lagu cannot stand by itself for an individual constituted Thaalam because only the lagu is a Thaalam by itself as seen in the EKA Thaalam of the above 7 Principal Thaalam.

A *Thaalam* may have any constant period (Time-constant) recurring for a time and it has, however, a departure and return with a fixed number of beats and feature.

KINDS of each of the 7 Principal Thaalam.

Each of the 7 Principal Thaalam in addition to its feature has two main kinds of which one is its own Kind and the other is the Kind of its beat. The former kind is called *Jaathi* and the latter kind is called *Nadai* of the Thaalam.

The *Jaathi* of a Thaalam is that of the Lagu of the Thaalam because the Lagu is variant in its numerical kind of beats and also can be a whole by itself (e.g. *Eka* Thaalam) although it is a part in association with other parts in a Thaalam while the Anudhrutham and Dhrutham cannot be wholes by themselves as they are constant in their numerical kinds of beats and thereby discarded for the determination of the *Jaathi* but included when they are needed for the different constitutions of a Thaalam. The *Nadai* of a Thaalam is that of the counts of the beat of the Thaalam. These kinds or *Jaathi* and *Nadai* are expressed in terms of numerical measures in a Thaalam.

Note : Now it can be well understood that while the Lagu is itself a Principal Thaalam called *EKA* Thaalam, its singular or

plural number in association with an Anudhrutham and Dhruthams in different modes (arrangements) and numbers constitutes the other six of the seven Principal Thaalam.

The KINDS in terms of Numerical Measures

A Thaalam is a capital unit of time-measure, measured by the number of beats and their duration of time. A Beat is a major unit of time-measure, measured by the number of counts and their duration of time. A Count is a minor unit of time-measure which is the least numerical measure with its duration of time. All these measures are calculated within a common constant of time which is the Thaalam taken.

Since the time-measures or durations of time are latent in the Numerical Measures, the kinds or *Jaathi* and *Nadai* are expressed in terms of the conventional *Five Numerical Groups* of 3, 4, 5, 7 and 9 respectively. These Numerical Groups have their own Numerical Names which are linked with Adjectives of *Jaathi* and *Nadai* to describe their corresponding kinds of Numerical Group of Beats in the Lagu and of Counts in the Beat of a Thaalam. Also, these Numerical Names become *Adjectives* to describe their own kinds of the Numerical Group of Counts in the Basic and Super measures called *Gathi* and *Jethi* respectively in one and the same beat of a Thaalam. The reason for these different nounal and numeral adjectives for the same series of the 5 kinds of Numerical Group is for the sake of discriminating those kinds in the Lagu, in the Beat and in the Basic and Super measures of a beat in a Thaalam.

Chart showing the Kinds of Lagu which become the Kinds of the Thaalam of that Lagu and the Kinds of Beat in

terms of the Numerical Measures—pertaining to any one PrincipalThaalam.

No.	Numerical Measures The respective number in the 5 Numerical Groups	The respective Names of the 5 Numerical Groups	Lagu Its kind due to its respective Numerical Group of Beats and which is known by the respective Numerical Name with the adjective of JAATHI	Thaalam Takes the double adjective of its Lagu for its own kind as :	Beat Its kind due to its respective Numerical Group of counts and which is known by the respective Numerical Name with the adjective of NADAI
1.	3	THIS-RAM	Thisra Jaathi Lagu	Thisra Jaathi Certain Thaalam	Thisra Nadai beat
2.		CHADHU-RAS-RAM	Chadhu-rasra-Jaathi Lagu	Chadur-asra Jaathi above Thaalam	Chadur-asra
3.	5	KAN-DAM	Kanda Jaathi Lagu	Kanda Jaathi above Thaalam	Nadai Beat Kanda Nadai
4.	7	MIS-RAM	Misra Jaathi Lagu	Misra Jaathi above Thaalam	Beat Misra Nadai
5.	9	SAN-KEER-NAM	Sankeer-na Jaathi Lagu	Sankeer-na Jaathi above Thaalam	Beat Sankeer-na Nadai Beat

Thus when the Lagu of the 7 Principal Thaalam is made to have each of the 5 Numerical Groups (Numerical kinds or Jaathis) of beats, 5 *Jaathis* (Numerical Jaathis) of the Lagu are obtained for that one particular Thaalam which then takes the Names of those 5 *Jaathis* (as the Names of the 5 Numerical Groups linked with the adjective '*Jaathi*' to each) to itself due to its possession of the respective Lagu of the 5 Numerical Groups or Kinds or Jaathis of beats as shown below :

Note : The 5 Numerical Groups or Kinds in order of 3, 4, 5, 7 and 9 called respectively Thisram, Chadhurasram, Kandam, Misram and Sankeernam are represented by T, C, K, M and S respectively. These 5 Kinds of Numerical Group are called JAA - THIS for the Lagu and thereby for its Thaalam, and NADAI for the Beat and thereby for its Thaalam, The same 5 Kinds are called GATHI and JETHI for the Basic and Super measures respectively in a Beat. All these different names for the same 5 kinds are for the sake of discrimination as mentioned before

JAATHI AND NADAI

A Principal *Thaalam* has
5 JAATHIS

By the Number of Beats in its Lagu (Lagus are homogeneous or of the same kind in a *Thaalam*)

T	C	K	M	S
3	4	5	7	9
Beats in the Lagu	Beats in the Lagu	Beats in the Lagu	Beats in the Lagu	Beats in the Lagu
(one of these 5 Jaathis at a time in the <i>Thaalam</i>)				

and 25 NADAIS

By the Number of Counts in its Beat (Beats are homogeneous or of the same kind in a *Thaalam*)

T	C	K	M	S	T	C	K	M	S	T	C	K	M	S	T	C	K	M	S	T	C	K	M	S
3	4	5	7	9	3	4	5	7	9	3	4	5	7	9	3	4	5	7	9	3	4	5	7	9

(One of these 5 Groups of counts at a time in the beat of any Jaathi)

Taking a JAATHI of a Principal Thaalam, when the beat of the JAATHI is made to have the 5 Numerical Groups of COUNTS individually, each such JAATHI (of the Thaalam) will have 5 Nadais. Hence the 5 Jaathis of one Principal Thaalam will have $5 \times 5 = 25$ NADAIS. In other words, every one of the 7 Principal Thaalam has 5 Kinds (JAATHIS) and 25 SUB-KINDS (NADAIS). Hence the 7 Principal Thaalam will have $5 \times 7 = 35$ KINDS called SOOLAADHI Thaalam which are in general use and $25 \times 7 = 175$ SUB-KINDS of special interest. In other words, the 7 Principal Thaalam have 35 JAATHIS and 175 NADAIS.

Taking a *Nadai* (counts of the beat) of a *Jaathi* meaning a *Jaathi* of a *Thaalam* which is a *Jaathi* of the *Lagu* of the *Thaalam*, while the initial *Nadai* (any of the 5 Numerical Groups of Counts originally) is constant in the beat, another *Nadai* (any of the 5 Numerical Groups of Counts differently) can be either *interposed* or *imposed* in or on the beat. In the former, the two measures (initial and interposed) irrespective of their individual counts have the same duration of time (duration of the original beat) and in the latter, the two measures (initial and imposed) have their own individual duration of time. During the progression of these measures the interposed and basic measures satisfy each other beat-to-beat in a Thaalam while the imposed and basic measures end equivalently only at certain stages of one or more Thaalam. While the initial *Nadai* or Basic measure is the *Gathi*, the interposed and imposed *Nadais* or Super Measures are the *Jethis*. But under these circumstances the *Gathi* is totally latent while only the *Jethi* is manifest. Hence a certain *Jethi* in or on a certain *Gathi* means a variant new *Nadai* (numerical group of counts) over a constant old *Nadai*

(numerical group of counts) in a beat or in a Thaalam of a certain period.

Thus the 5 *Gathis* or Basic Measures of a Beat will have each 5 *Jethis* or Super Measures by which a number of $5 \times 5 = 25$ Super Measures (*Je-his*) or Cross-Rhythms are obtained for the 5 Basic Measures (*Gathis*) or Basic Rhythms.

Two kinds of rhythmic progression in a Thaalam of a period.

Generally, the tempo (speed) or period of a Thaalam, of the beat of the Thaalam and of the counts of the beat of the Thaalam are all kept the same (constant) throughout the performance of a musical composition. Improvisations or extemporizations which are the regular feature of the South Indian music are made only on these temporal stabilities of a Thaalam. But when intellectual amusement or certain other such needs are demanded, the following are observed :

Thaalam and Beat.

If any change of the tempo (speed) or of the number of beats or of the number of counts of the beat of a Thaalam is to be effected, it is done in geometrical (in double) measures. When the initial number of beats within a common constant of time or a period of Thaalam taken is altered geometrically, the number of the original Thaalam also is varied accordingly. But when the initial number of counts within the beat of a constant duration of time is altered the original Thaalam may not be altered in its number.

e. g. Take the EKA Thaalam of a certain tempo (speed) or period. Let it contain 4 beats of the same duration of time each within its period or common constant of time.

Now accelerate or decelerate geometrically the number of beats within the common constant of time or the original period of the Thaalam. If the new number of the beats were to be 8, the original Thaalam is doubled; and if it were to be 2, the original Thaalam is halved. At the same

time the number of counts of the original beat may remain constant or vary from unit count to even number of counts of different magnitudes within possibilities in the new beat. Generally, the beat or Thaalam is not affected by the number of counts as is the Thaalam affected by the number of its beats

Beat and Count.

(Two kinds of magnitude of a Super Measure)

The time factor being constant, if a Super Measure is *interposed* in the Basic Measure of a beat, the *interposed* counts are inversely proportional in magnitude to their number and if it is *imposed* on the Basic Measure in a beat, the *imposed* counts are directly proportional in magnitude to their number.

The Interposition (change of *Nadai*) and Imposition (charge of *Nadai*) may be in different speeds within the time-constant.

S U M M A R Y

Thus these numerical variations (by which the time intervals can vary) of counts, beats and *Thaalam* are all performed within the constant period of a *Thaalam* or within a common constant of time.

Chart of the 7 principal Thaalam

[with particulars showing how each of the 7 principal Thaalam has 5 JAATHIS by its Lagu (Lagus are homogeneous or of the same kind in a Thaalam) because the JAATHI of a THALAM is that of the Lagu (a Thaalam by itself) of the Thaalam, The 35 Soolaadhi Thaalam obtained by these 5 JAATHIS to each of the 7 Principal Thaalam (horizontal $5 \times$ vertical $7 = 35$) are also obvious through this chart.]

The total number of beats in the Lagu corresponding to the 5 Numerical Groups for its respective 5 JAATHIS and the total number of beats of the whole Thaalam for each of such 5 Jaathis pertaining to every one of the 7 Principal Thaalam.

No.	The 7 Principal Thaalam	Symbolic Representation.	1 THISRA Jaathi		2 CHADHURASRA Jaathi		3 KANDA Jaathi		4 MISRA Jaathi		5 SANKERNA Jaathi	
			Total Number of Beats in the		Total Number of Beats in the		Total Number of Beats in the		Total Number of Beats in the		Total Number of Beats in the	
			Lagu	Whole Thaalam.	Lagu	Whole Thaalam	Lagu	Whole Thaalam	Lagu	Whole Thaalam	Lagu	Whole Thaalam
1.	DHRUVA	1011	3*	11	4	14	5	17	7	23	9	29
2.	MATYA	101	3	8	4	10	5	12	7	16	9	20
3.	ROOPAKA	01	3	5	4	6	5	7	7	9	9	11
4.	JHAMPAL	1 — 0	3	6	4	7	5	8	7	10	9	12
5.	THIRI- POOTAI	100	3	7	4	8	5	9	7	11	9	13
6.	ATA	1100	3	10	4	12	5	14	7	18	9	22
7.	EKA	1	3	3	4	4	5	5	7	7	9	9

- Note :
1. The total number of beats of a Thaa'am is the sum of the beats of all the parts of the Thaalam while it is only the number of beats of the Lagu for the Eka Thaalam.
 2. There are 5 different total number of beats for a Thaalam due to its 5 Jaathis
 3. There are 5 different total number of counts for each total number of beats of a Thaalam. In other words, there are 25 different total number of counts for a Thaalam.
 4. The total number of counts of any two suitable Thaalam can be brought to the same by suitable changes of Jaathi or Nadai (Basic measure or Gathi) in them.
 5. Taking the total number of beats of a certain Thaalam the parts or feature of the Thaalam may be changed for the same total number of beats where by the initial Thaalam will automatically be changed to another.

Regarding the above Thaalam :

- Note :
- i) Roopaka Thaalam has reverse order of reckoning as Dhrutham followed by Lagu while the 5 of the other 6 of the 7 principal Thaalam are reckoned with Lagu first and the sixth with only Lagu.
 - (ii) Only 3 of the 7 Principal Thaalam have plural Lagus. They are Dhruva (having 1 Lagu before and 2 Lagus after a Dhrutham), Matya (having 1 Lagu before and 1 Lagu after a Dhrutham) and Ata (having 2 Lagus followed by 2 Dhruthams).

General presumptions (unless otherwise stated)
of the 7 Principal Thaalam and of a Beat.

No.	The 7 Principal Thaalam	JAATHI or KIND presumed	The number of beats in the Lagu or Lagus for the respective Jaathi- (Plural Lagus are homogeneous or of the same kind in a Thaalam)
1.	DHRUVA	Chadhurasra Jaathi	Lagus have 4 beats each
2.	MATYA	Chadhurasra Jaathi	Lagus have 4 beats
3.	ROOPAKA	Chadhurasra Jaathi	Lagu has 4 beats
4.	JHAMPAI	Misra Jaathi	Lagu has 7 beats
5.	THIRIPOO-TAI	Thisra Jaathi	Lagu has 3 beats
6.	ATA	Kanda Jaathi	Lagus have 5 beats each
7.	EKA	Chadhurasra Jaathi	Lagu has 4 beats

A Beat is presumed to have 4 counts (unless otherwise stated)

Note : 1) Since EKA Thaalam is only a Lagu, it is sometimes called Sarva Lagu Thaalam (Sarva = all).

2) Maathirai is the unit of duration of time in language while it is the unit of number for reckoning in music.

Table :	3) 2 counts = 1 Kalai (Sometimes 1 count = 1 Kalai)
	2 Kalais or 4 counts = 1 Beat or 1 Anudhrutham
	2 Anudhruthams = 1 Dhrutham
	2 Dhruthams = 1 Lagu
	2 Lagus = 1 Gooroo
	3 Lagus = 1 Plootham
	4 Lagus = 1 Kaakapaadham

Thus the 7 Principal *Thaalams* and the 35 Soolaadhi *Thaalams* are reckoned with the Beat. But on the other hand the classic *Thaalams* (like the 108 Classic *Thaalams*) are reckoned with the Lagu of 4 beats which is taken for a unit called *Maathirai*. Hence it is to be noted that there are two modes of reckoning a *Thaalam* as above in South India.

Also, it is worthy to note that while the Lagu of the 7 Principal and 35 Soolathi *Thaalams* is a variant unit of Time-Measure, the Lagu of the 108 Classic *Thaalams* is a constant unit of Time-Measure.

SPECIAL INTEREST :

350 *Thaalams*.

Apart from the already mentioned 5 Numerical Groups (kinds) of 3, 4, 5, 7 and 9 respectively, there are also other 5 Numerical Groups of 6, 8, 10, 12 and 16 respectively which when applied to the Lagu and Beat of the *Thaalam* as before give a number of 175 kinds of *Thaalams*. This new number of 175 and the old number of 175 make 350 kinds of *Thaalams* of special interest.

Ratio and proportion of Rhythm.

Suppose a certain number of beats or letters has to be equally distributed over an initial number of beats of a *Thaalam* of a certain period. Proceed to do this as given below.

Tell every count of the distributable number with the value of the beat-number while the value of the distributable number to every beat is latent.

e. g. Take a *Thaalam* of any period with 8 initial beats. To distribute 15 beats or letters equally over the 8 beats:-

Tell each count of 15 with the value of 8 degrees over the space of 8 beats of the value of 15 degrees each.

This can be represented by $15 : 8 :: 8 : 15$

RHYTHM PRACTICE.

Nothing else than a metronome which is an instrument that pulsates at regular intervals of time is the best tutor for the perception of rhythmic compass.

Sit before a good metronome or even before a pendulum-clock. Adjust the bob of the pendulum to your convenience. Wind and start the instrument.

The period of oscillation of the pendulum being uniform and accurate within a certain limit of time, a click of it may be taken for a beat which is the constitutional unit of a *Thaalam* and the period of it for the tempo or the continuity of speed and rhythm of the beat in space of time.

Now keeping the click as a common constant of time-measure tell repeatedly for sometime within the same duration of time of the single click 'One', then 'One, Two,' then, 'One, Two, Three', then 'One, Two, Three, Four', and so on each time with one more than the previous number up to as many numbers as you can. By this, it will be observed that the number and speed are relative to each other for a click of a constant duration of time.

With the observations thus made it would be clear that each of the 5 Numerical Groups or Kinds already mentioned can be uttered as a different numerical unit by turns for a beat of a constant duration of time in a *Thaalam* of a certain tempo or period.

Hence practise well from one to any number as also the above 5 Numerical Groups one by one to a single beat of a constant duration of time for a firm perception of the rhythmic compass with which faculty the number of counts in the beat and the number of beats in a *Thaalam* can be varied with relative speeds easily at will within a common constant of time-measure.

TEMPO

Tempo or Layam is the speed of a *Thaalam* or Rhythm cycle. It depends upon the period of the homogeneous (same kind) beat which is the basic element of the *Thaalam*. The foundation of the beat is the count which is either constant or variant in number within the constant time of the beat. Sometimes, also the number of beats within the constant period of a *Thaalam* is either constant or variant. In other words, if the original period of a *Thaalam* were to be taken for a common constant of time-measure, the

Thaalam itself may vary in its number owing to the numerical variation of its beats (with relative speeds) within the original period of the Thaalam. Thus the Thaalam presents varieties in tonal time.

For variations of the above kind either of rhythm or of melody there are 5 degrees of speed or tempo in Indian music of which only the first 3 as given below are in frequent use.

Taking the number of counts or beats or thaalams within a time-constant, if n is the number in the first degree of speed, then $2n$ and $4n$ (doubled in each subsequent case) will be in the second and third degrees of speed in the increasing order and $n/2$ and $n/4$ (halved in each preceding case) will be in the second and third degrees of speed in the decreasing order. These 3 tempi are called **Vilamba**, **Madhyama** and **Thri Kaalams** respectively in the ascent and **Moodhal**, **Keezh** and **Irandaam keezh Kaalams** respectively in the descent.

Within a time-constant the total number of beats of any of the 35 Soolaadhi Thaalam or any of the 5 Jaathis of any of the 7 Principal Thaalam is constant in spite of the variations of tempo while the total number of counts in a beat of any of the above Thaalam may range from 1 to 64 (as per the 5 degrees of speed, doubled or halved in each next case from the slowest to ascend and the fastest to descend) due to the variations in tempo.

LAYAM and THAALAM

Layam or tempo is the continuous movement of speed and rhythm in space of time while Thaalam or Rhythm-cycle is a recurring limited period of time of the Layam.

Example from a Metronome or a Pendulum-clock :

Layam is the period or the constant interval of time of an oscillation or a click (the boundary mark of the oscillation) of the pendulum.

Thaalam is the numerical constitution of beats while a beat is a single click or a boundary mark of an oscillation or a period of oscillation.

Now, if the same number of beats of a Thaalam is made fast or slow, the Layam or tempo is said to vary. So in the space of time or within a common constant of time the speed is the Layam and the numerical constitution is the Thaalam.

Thus Layam may change while Thaalam remains constant and Thaalam may change while Layam remains constant.

Vice versa tempi of the Rhythm (Thaalam) and the Melody (Verbal composition) within a common constant of Tempo (Layam)

Taking the original period of a Thaalam for a common constant of tempo, layam or speed, keep the tempo of the rhythm in terms of beats of the thaalam coinciding with the common constant and sing the melody in terms of verbal composition at double and quadruple speeds within the common constant; again keep the tempo of the melody in terms of verbal composition coinciding with the common constant and reckon the rhythm in terms of beats of the thaalam at double and quadruple speeds within the common constant. The former and the latter vice versa performances are called ANOOLOMAM and PRATHIOMAM respectively. These are found in the *Pallavi* singing of the South Indian classical music.

RHYTHMIC ALPHABET

(called Rhythmic Solfa Letters)

The South Indian rhythm-letters are oftentimes called JADHI. They are usually **THA, THATH, THAAM, THAI, THAIYA, THOME, TA, DHE, DHITH, DHEENG, GI, GCO, GOOM, JEM, JANU, KA, KI, KOO, ME, NA, RE ROOM** and so on (some onomatopoeics are also used). These are either used individually or linked to form phrases or Solkattoos for the respective counts of the 5 kinds of Numerical Group (already mentioned) as given below:

The 5 Rhythmic phrases or solkattoos for the 5 kinds of
Numerical Group

No.	Names of the 5 Numerical Groups	Number of counts in the respective Group to be phrased	Phrases or Solkattoos of rhythmic letters for the number of counts in the respective Group.
1.	THISRAM	3	THA - KI - TA
2.	CHADHURA-SRAM	4	THA - KA - DHE - ME
3.	KANDAM	5	THA - DHING - GI - NA - THOME
4.	MISRAM	7	THA - KI - TA - THA - KA - DHE - ME
5.	SANKEER-NAM	9	THA - KA - DHE - ME - TAA - DHING - GI - NA - THOME

Note : The phrase **THA-DHING-GI-NA-THOME**, used for 5 counts is also used for counts of 6, 7 and 9 by

lengthening the duration of one or more of its constituent letters as much as is required to suit the purposes.

THALA ANGOO is a phrase for 4 counts.

The rhythm letters constitute the rhythmic alphabet for playing or even vocalizing rhythms.

Reciting or chanting rhythm-letters or **JADHIS** is an art by itself and it usually follows in parts or wholes of Thaalam after a verbal singing, unless it is performed absolutely.

EDOOPPOO OR PLACE OF COMMENCEMENT OF A MELODY OR RHYTHM IN A THAALAM.

Edooppoo is the fractional place of commencement of the melody or rhythm in a Thaalam. A unit of even number is considered for this. This unit may involve either one or two beats in a Thaalam, generally at the beginning.

Taking a unit of 4 counts, commencing with the first count is Sama-Edooppoo (simultaneous). Commencing with the 2nd, 3rd and the 4th counts leaving 1, 2 and 3 counts respectively are Quarter ($\frac{1}{4}$), Half ($\frac{1}{2}$) and Three-fourths ($\frac{3}{4}$) Edooppoos respectively.

The Edooppoos after the Sama-Edooppoo are called **ANAAGADHA** Edooppoos (after a Thaalam begins) and before the Sama-Edooppoo they are called **ADHEETHA** Edooppoos (before a Thaalam begins).

Special interest : There are also **ANAAGADHA** Edooppoos of $7/8$ meaning to commence after the lapse of 7 out of 8 counts in a beat and also after $1, 1\frac{1}{4}$ and $1\frac{1}{2}$ beats after a Thaalam begins. There is also **ADHEETHA** Edooppoo of

3/8 meaning to commence after the lapse of 3 out of 8 counts in the beat before the beginning of a Thaalam.

AADHI THA 'LAM is the most popular Thaalam. It is known also as JHOMPATA or CEMPATA Thaalam. It is the Chadhurasra Jaathi THIRIPOOTAI Thaalam of the 7 Principal Thaalam or one of the 35 Soolaadhi Thaalam. It has 8 beats in all with a Lagu of 4 beats followed by 2 Dhruthams of 2 beats each. Unless otherwise stated, its beat is presumed to have 4 counts (Chadhurasra Nadai) so that its total number of counts is 32 (8×4).

OTHER THAALAMS

Apart from the Thaalam hitherto mentioned, there are other Thaalam of which the CHAPU Thaalam (Synco-pated Time-Measures) and the DHESAADHI and MADHYAADHI Thaalam are popular.

CHAAPU Thaalam have each 2 beats of different duration of time and number of counts. They are reckoned with two Palm-taps or with a Palm-tap followed by a Hand-wave.

Chart showing the particulars of CHAAPU Thaalam.

No.	CHAAPU Thaalam of the following Numerical Kinds	Counts in the First beat. (Short beat)	Counts in the Second beat. (Long beat)	Total number of counts in each kind of Chaapu
1	THISRA Chaapu	1	2	3
2	KANDA Chaapu	2	3	5
3	MISRA Chaapu	3	4	7
4	SANKEERNA Chaapu	4	5	9

Unless otherwise stated, the general presumption of a CHAAPU Thaalam is the MISRA CHAAPU.

DHESAADHI AND MADHYAADHI THAALAMS.

The Dhesaadhi and Madhyaadhi Thaalam have each 4 beats for a Thaalam. They are reckoned with a Hand-wave or Visarjitham followed by 3 Palm-taps. The difference between the two Thaalam lies in the respective Edooppoos (fractional places of commencement) in them. In the Dhesaadhi Thaalam the music starts after the lapse of 3 out of the 4 counts of the Hand-wave beat and in the Madhyaadhi Thaalam, the music starts after the lapse of 2 out of the 4 counts of the Hand-wave beat.

Best South Indian musical percussion instrument (LAYA VAADHYAM) of indefinite or variable pitch to keep time with Thaalam.

MROODHANGAM is the ancient best indigenous percussion musical instrument (LAYA VAADHYAM) of indefinite or variable pitch (capable of being tuned to the keytone of choice) to keep time with Thaalam because it possesses rich overtones or upper partial tones.

Mroodhangam is a development of the indigenous outdoor MADHDHALAM (a variety developed from the PARAI or drums of the indigenous Thamizhs of South India in the distant past). It was originally made of clay resonator which was substituted by wooden one in later times. Its two heads of different diameters are covered with hides. One of the heads has a permanent black paste made of boiled rice, pulverised iron-stone and glue while the other is left to receive then and there a temporary paste of boiled

rice and oven-ash with water. The pitches of the two heads are either identical or in the ratio 1 : 2 or 2 : 3 (S : Sa₂ or Sa : Pa i.e. C : C₂ or C : G). The permanent black-pasted head gives a whole tone higher than the tuned tone when played openly meaning without the touch of the tip of the ring finger (usually of the right hand) on its edge. This instrument is played with the fingers of usually the right hand on the black-pasted head called the Sun-side and with the under-wrist and Venus-mount aided by the mid-finger of the hand of usually the left arm on the other or bigger head called the Moon-side. Sometimes the bigger head is played by taps with hanging row of fingers of usually the left hand. This instrument is usually played with both hands simultaneously.

Special Interest.

PANCHAMOOGHA VAADHYAM.

A speciality of the Drums of South India is the very ancient Penta-faced Drum called the PANCHAMOOGHA VAADHYAM of 5 heads with a common resonator. Each of the 5 heads emits a different tone of the 5 respective tones other than the tonic and its fifth in a scale. This drum with two pot-drums of the complementary two tones (tonic and its fifth i. e. Sa and Pa or C and G respectively) by its sides constitute a musical scale.

Vocal substitutes for the Mroodhangam.

KONNAKKOL : By the articulating faculty of the human vocal mechanism with its Larynx, Vocal cords, Nose, and the Tongue and Teeth in the mouth, rhythmic vocalization is performed in addition to the melodic singing

in music. Such rhythmic vocalization with rhythmic letters and some onomatopoeias in conformity with the Thaalam in a musical manner is called KONNAKKOL.

NATTOOVAANGAM: is chanting KONNAKKOL with rhythmic syllables for the movement of the body with hand-codes (Moodhiraais) in dance. But when the dancer performs exclusive foot-step rhythms (with appropriate limb-movements) called ADAVU, the Nattoovaangam is either vocalized or played with hands in terms of rhythm-marks with a pair of basin-cymbals (*Koozhi-Jaalra*) or with a pair of wands on a wooden block. Nattoovaangam precedes, follows or intervenes a verbal singing.

These performances have no parallel in any other country of the world.

THEERMAANAM (Conclusion) or MOOTHAAYIPPOO **(Three conclusive taps)**

This is usually a thrice-recited **END-GROUP** of rhythmic or melodic units to mark the end of a rhythmic or melodic performance. The last letter or tone of the **END-GROUP** is longer in duration of time called **KAARVAI** than any other in the group. This last letter or tone at the third time of recitation of the group coincides with the end of the performance or with the commencement of the successive Thaalam to continue the performance.

There are also other kinds of **THEERMAANAM** which are but only integrated groups not following the above principle. They are known as **NIRAVAI MOODIVOOS** (Filled-up Ends). They are very useful for

end groups for Thaalam of odd number of beats, not divisible equally.

During classical performances these THEER-MAANAMS are played in an elaborate manner and are followed by a KOREVAI (train) of THA-DHING-GI-NA-THOME phrases called Thadhinginathome Korevai which has at its end a code for an indication of the original Edooppoo or fractional place of commencement of the rhythmic or melodic performance. From this indicated place in the Thaalam the Soloist who has been silent only during such performance and the accompanist resume their original performance and very soon come to an end with the usual type of the "Three-Taps" THEERMAANAM.

MOHRAAS are also conclusions. They are formulae of syllables of different rhythmic patterns for the 35 Soolaadhi Thaalam. The setting of the Mohraas for the Thaalam of odd number of beats, not divisible equally, require dexterity.

Compound THAALAMS are based on the symmetry of parts of the combined Thaalam. e.g.

No.	Name of the compound Thaalam	Parts-symbolic representation	Total number of beats for Chadhurasra Nadai
1.	DHRUVA-ROOPA-KA Thaalam	101 101	20
2.	THIRIPOOTAI-EKA Thaalam	10 01	12

SPECIAL INTEREST :

(1) AVADHAANA THAALAM

Different performances done simultaneously is the art of AVADHAANAM; and thus two different thaalam kept one on each hand simultaneously are called AVADAANA THAALAM each.

The principle involved in this is that the tempi and the total number of counts of the two Thaalam being the same. their parts (features), the number of beats in their Lagus which impart JAATHIS to their Thaalam, the number of counts in their Beats which impart NADAIS to their Thaalam and their total numbers of beats are all different (from one another) on different hands.

e. g. Take a MISRA JAATHI JHAMPAL THAALAM of CHADHURASRA NADAI on one hand and a CHADHURASRA JAATHI THIRIPOOTAI THAALAM of KANDA NADAI on the other hand.

The former has 10 beats of 4 counts each amounting to 40 counts (10 x 4) in all. The latter has 8 beats of 5 counts each amounting to 40 counts (8 x 5) in all. Thus these two Thaalam, in spite of their differences of Number of parts, Number of beats in the Lagu alone, Number of counts in the Beat and Total number of beats, have the same total number of counts and the same tempo.

Know How

To cover or finish a common total number of beats by all the 7 Principal Thaalam starting simultaneously, each of such Thaalam has a suitable JAATHI and recurs a

specific number of times as given below (generally, the lengths of the verbal composition and the time-measure satisfy each other).

Thaalam	JAATHI	Recurring number of times	A common total number of beats
DHRUVA	Chadhurasra	30	420
MATYA	Chadhurasra	42	420
ROOPAKA	Chadhurasra	70	420
JHAMPAL	Misra	42	420
THIRIPOOTAI	Thisra	60	420
ATA	Kanda	30	420
EKA	Chadhurasra	105	420

Measure and Metre (Meter)

In South Indian rhythm, if *Measure* were to be a compass of time, *Metre (Meter)* would be a succession of certain divisional groups of counts filling it.

Judged in this sense, South Indian rhythms too have metres similar to those of the so-called occidental rhythms like Rumba, Samba, Conga, Tango and Fox-trot and so on.

MELODY

The whole science of melody Eastern or Western, is based upon the fundamental factor of consonance called SAMVAADHITHVA which is a series of tones or swarams obtained by the cycles or spirals of Fifths and Fourths starting from the Fundamental as Sa - Pa (C - G) series and Sa - Ma (C - F) series respectively. The origin of the above idea of the Fifth and Fourth from the Fundamental could be from the intuition of the latent and phenomenal fact of the Perfect Fifth (the highly concordant tone next to the Octave) and the Perfect Fourth from the Fundamental being the *natural ratios* found in the *human voice* produced by the vocal cords of the Larynx.

The South Indian music belongs to Melodic system meaning a system of tones in succession while the European music belongs to Harmonic system meaning a system of tones in parallel. The South Indian Melodic system is based on a natural scale or a scale of acoustically correct or true tones called the JUST INTONATION scale which is also known as TRUE INTONATION or PURE INTONATION or even UNEQUAL TEMPERAMENT scale unlike the European EQUAL TEMPERAMENT scale which is an artificial scale or a compromise between the acoustically correct intervals and those required for keyboard instruments of the Piano or Harmonium type. The Indian scale differs from the European scale of successive tones which form a geometrical progression or have the same common interval by which the frequencies of some of them of the octave that is divided into twelve equal intervals or semitones are either below or above their true ratios. Although the difference in the frequencies in these two systems of tuning is very slight, yet it is quite perceivable difference for the South Indian ear.

[In India, the Karnatic and Hindusthaani (*bifurcated*) systems of music, in spite of their different cultures, do not have important differences in their fundamentals.]

The tone is the fundamental basis of melodic organisation and helps to constitute a scale. For the constitution of a melody (not Raagam which is a tonal-essay with specific tones in immeasured time) two tones or swarams are the minimum (from a study of world music).

The South Indian music is performed to the Fundamental or one common tone called Aadhaara Sadjam or Aadhaara Sroothi or Keytone which is a tone on which the scale or key is based.

Karnatic music which is Aryan in form but Dravidian in content is an amalgam of the ancient South Indian Thamizh or Dravidian music which is one of the oldest systems of the world and the medieval music of South India.

The bifurcation of the Karnatic and the Hindusthaani (Aryan in culture) systems of music in the South and North of India respectively appeared only before about twelve centuries.

Note : Aadhaara Sadjam,, Aadhaara Sroothi, Fundamental, Groundtone, Keytone and Reference-tone are synonymous.

PITCH is the degree of elevation or depression of a tone. It is absolute when it is expressed in frequency (number of vibrations per second) and is relative when it is expressed in comparison with another tone. The Indian pitch is relative meaning a tone of any frequency unlike the European absolute pitch of the Middle C expressed in frequency. Even in South India the Middle octave Sadjam (C) was a tone of precise frequency during the harp age, but

this so-called absolute pitch was meant only for tuning musical instruments. With the emergence of the Aadhara Sadjam and Panchamam (C and G) as unchangeables (not admitting of varieties) during the 18th century all music in South India came to be sung once for all to a common tonic. The indigenous south Indian Singer from ancient time has the freedom of pitch or the Choice of Keytone called KOORAL (voice) which is not had by the European Singer.

Note : Frequency, Note, Pitch, Tone, Sroothi and Swaram are synonymous.

INTERVAL is the difference of pitch between two tones. In South Indian music, interval counts more than the tone or swaram.

SCALE is a key or a set of tones based on a particular tone or a system of tones definitely related to one another. It can also be defined as an organisation of pitches of defined frequencies in relation to the Fundamental or Reference tone (called Sroothis or Swarams) used in an octave. The ascent and descent of the scale are known as Aarohanam or Yetram and Avarohanam or Irakkam respectively.

The ancient indigenous Thamizhs or Dravidians had even Half-scales or Tetrachords (tetra = four : chord = string i. e. a string of 4 tones, which is either from Sa to Ma i. e. C to F or Pa to Sa2 i. e. G to C2) before they had octaves.

Note : Gamut, Graamam, Key, Mode, Moorchanai, Melam, Octave, Raagam, Scale and Sthaayee are synonymous.

MELODIC ALPHABET

(called 'Melodic Solfa Letters')

The very ancient South Indians who were the first to recognize the 7 Principal tones (the 7 intervals representing complete cycle of tones) in an octave used the 7 vowels (acoustically musical) of their language alphabet to voice them. Later on the 7 tones were named SADJAM (SHADJAM), RESHABAM, GANDHAARAM, MADHYAMAM, PANCHAMAM, DHAIVATHAM and NISHAADHAM respectively and intonated with the respective first letter of the names. These letters became the Indian melodic alphabet. Swarams or Solfa letters from the medieval period in South India. Except Sa and Pa or C and G (unchangeables from about the mid 18th century) the other 5 tones of the 7 Principal tones take adjectives along with their names for specification of their kinds.

[In Europe these 7 Principal tones called Do, Re, Me, Fa, Sol, La, Te or Se are represented by the English alphabetic letters C, D, E, F, G, A and B respectively.]

The South Indian (Indigenous) Division of Tone or Scale of 22 Sroothis.

SROOTHI AND 22 SROOTHIS

A Sroothi (shroothi) is a subtle tone or the smallest audible difference of pitch and it is less than a semitone. It has three different magnitudes in value but never a constant one. Since the value of a Sroothi could be expressed as ratio to the Fundamental or in terms of frequency as vibrations per second or in terms of intervals as Cyclic cents or equal parts, these three different values of a Sroothi could be expressed as the intervals of 20, 70 and 90

cents respectively while the Octave is divided into 1200 cyclic cents or equal parts. Generally, a Sroothi is called a Quarter tone or even a Microtone.

The characteristic feature of the South Indian music is the theory of Sroothis. The octave is divided into 22 intervals of **unequal pitch** discarding tones with intervals of less than 22 cents. These 22 Sroothis, the barest minimum, are the foundation of the South Indian musical scale.

A series of Pa(G) tones and a series of Ma (F) tones from the Fundamental (Sa or C), the perfect consonances (while a tone and its replica are absolute consonances), are the Cycles or Spirals of Fifths and Fourths. The Fifth and Fourth of each tone become the tonics respectively in each of the cycles. In these cycles the relation of the new Pa (G) and Ma (F) to the Fundamental (Sa or C) is determined. These processes are continued till the 12th cycle in each case when it will be found that the 12th tone of the cycle in one case and the 11th and 12th tones of the cycle in the other case are higher or lower than Sa (C) or Pa (G) by a small interval while all the important tones for practical purposes have been obtained in the meanwhile within this compass as shown in the following chart of 22 Sroothis. Further cyclic tones are only of academic interest.

CHART of Cycles or Spirals of Fifths and Fourths.

Letter names of tones are : Indian - Sa, Re, Ga, Ma, Pa, Dha, Ni

European - C, D, E, F, G, A, B

Cycle of	From	1	2	3	4	5	6	7	8	9	10	11	12
FIFTHS	S A D J A M Sa or C	Pa G	Chadusroothi Re D	Chadusroothi Dha A	Chyutha-Madhyama Ga E	Chyutha-Sadja Ni B	Chyutha-Panchama Ma F	Suddha Re D	Suddha Dha A	Saadhaarana Ga E	Kaisiki Ni B	Begada Ma F	NOT USED
		Note the above 5 Pairs of tones from Pa or G											
FOURTHS		Suddha Ma F	Bairavi Ni B	Bairavi Ga E	Ekasroothi Dha A	Gowla Re D	Prathi Ma F	Kaakali Ni B	Anthara Ga E	Thrisroothi Dha A	Thrisroothi Re D	NOT USED	NOT USED
		Note the above 5 Pairs of tones from Sa or C.											

NOTE : The above 10 Pairs of tones plus Sa (C) and Pa (G) make 22 tones or sroothis

In any of these two cycles there are* pairs of Re, Ga, Ma, Dha, Ni or D, E, F, A, B amounting to 10 tones which with Sa and Pa or C and G make 12 tones called **semitones**.

In the ancient South Indian musical scale, the 22 Sroothis were distributed over the 12 semitones of the scale (a Semitone is a region comprising a certain number of minute Sroothis) or distributed amongst the 7 Principal tones. Later-on when Sa and Pa (C and G) took a Sroothi each (out of the 22) and became unchangeables not admitting of varieties (no variations as flat and sharp) to give much fixity to the melodic characters, the remaining 20 (out of the 22) were distributed amongst the remaining 5 tones, Re, Ga, Ma, Dha, Ni or D, E, F, A, B respectively of the 7 Principal tones at the rate of 4 Sroothis for each.

Thus in a scale, the 7 Principal tones became the 7 Swarams, the 12 Semitones became the 12 Swarasthaanams and the 20 Quarter tones with Sa and Pa or C and G became the 22 Sroothis.

Any Sroothi or tone nearest to another is voiced oscillatingly to eliminate acoustic beats, if any.

The Sroothis actually belonging to a Raagam or mode attain the status of Swarams for that Raagam while the rest of the 22 Sroothis remain as Sroothis then. Thus the 22 Sroothis become Swarams in some Raagam or other and present varieties in tonal space.

Sometimes tones or Sroothis other than the 22 are delicately reached, but such ones are so minute in duration

and interval that they become grace tones or boundaries of oscillating tones (gamaka Sroothis) or reflections of adjoining tones.

NOTE : These traditional 22 Sroothis impart the peculiar charm and flavour characteristic to the indigenous South Indian music. These characteristic Sroothis are required for the melodic individuality of a Raagam. Thus these 22 Sroothis show the high degree of the South Indian musical culture

MELAKARTHA (Major Mode)

A Melakarta is a heptatonic or seventoned scale or major mode meaning the presence of the 7 tones in both the ascent and the descent of it. It is a full scale. It has 3 characteristics which are:

1. Fullness:-
(Sampoornam) — all the 7 tones of the scale are present in both the ascent and the descent.
2. Order with Fullness -
(Kramasampoornam) — each of the 7 tones occur only once in both the ascent and the descent and thereby the 7 tones are regular and not zigzag (vakram).
3. Homogeneity :-
(Sameness) — both the ascent and the descent have the same kind of individual tones.

NOTE : Fundamental scale or Raagam, Graamam, Janaka Raagam, Kartha, Melam, Moorchani, Melakarta, Pann, Parent Scale, Primary scale or Raagam, Root Ragam, Sampoorana Raagam and Thiram are synonymous.

THE 72 MELAKARTHAS (Major Modes)
of Venkatamakhi.

(Explained in terms of the Indian and European
 melodic letters — in an outline)

Unlike the old time Melakarthas which are based on the scale of the 22 Srooths with changeable Sa and Pa (C and G) which admitted of varieties, the 72 Malakarthas by Venkatamakhi are based on the scale of the 7 Principal tones or Swarams derived from the actual 12 plus virtual 4 making altogether 16 Semitones or Swarasthaanams in the octave as represented in the chart below. This scheme emerged after about the mid 18th century when Sa and Pa (C and G) became unchangeables not admitting of varieties to give much fixity to the melodic character. *In such a scale as this the presumption is that out of two tones virtually in one place, if one were to be actual, the other becomes virtual: and the distance or interval between them is supposed to be negligible.*

CHART of 12 TONES enlarged into 16 TONES in a Scale

Imagine the following 12 places of the chart to be the 12 consecutive keys (reeds) of an octave from any convenient key on the PIANO or HARMONIUM.

	1	2	3	4	5	6	7	8	9	10	11	12	13
Indian and European letters for the Tones	Sa C	Re 1 D 1	Re 2 D 2 Ga 1 E 1	Re 3 D 3 Ga 2 E 2	G 3 E 3	Ma 1 F 1	Ma 2 F 2	Pa G	Dha 1 A 1	Dha 2 A 2 Ni 1 B 1	Dha 3 A 3 Ni 2 B 2	Ni 3 B 3	Sa 2 C 2
Indian names for the Tones	Sadjam	Suddha Reshabam	Suddha Chadhuroothi Reshabam Saadhaarana Gaandhaaram	Shatsroothi Reshabam	Anthara Gaandhaaram	Suddha Madhyamam	Prathi Madhyamam VIKRITHA Panchamam	Panchamam	Suddha Dhaivatham	Suddha Chadhuroothi Dhaivatham Suddha Nishaadham	Shatsroothi Dhaivatham Kaisiki Nishaadham	Kaakali Nishaadham	Upper Sadjam

From the above chart it is evident that in an enlarged scale of 16 semitones there are 3 kinds of Re or D, 3 kinds of Ga or E, 3 kinds of Dha or A, 3 kinds of Ni or B and 2 kinds of Ma or F respectively. Also, it is evident that there are dual tones each of which assumes two names in the 3rd, 4th, 10th and 11th places of the above chart.

CONSTRUCTION OF THE 72 MELAKARTHAS

The 72 Melakarthis are schemed on the principle that a Melakarta according to its 3 characteristics already mentioned should contain both in the ascent and the descent all the 7 Principal tones each of which could be any one of its own kinds except Sa and Pa (C and G) which have no kinds.

Proceed as follows for the construction of the above scheme through Bifurcation, Permutation and Combination.

Have the given chart of the enlarged scale before you and bifurcate it into 2 Hexachords (hexa - six : chord - string, i. e. a string of 6 tones) as Sa to Ma 1 (C to F 1) and Pa to Sa 2 (G to C 2) respectively with Ma2 (F2) as the mid - tone. Let these two Hexachords be called Primary and Secondary Hexachords or Poorvaangam and Oothraangam Hexachords respectively with the mid - tone Ma2 (F2) suspended for the present.

Since these two Hexachords are quite similar to one another in all respects except that one of them is higher or lower in pitch than the other, construct similar Tetrachords (tetra - four : chord - string, i. e. a string of 4 tones) from them which when combined with one another in the order given below will give the 72 Heptatonic (hepta - seven, i. e. seventoned) scales called Melakarthis.

Primary or Poorvaangam Hexachord	Ma2 (F2) is suspended for the present	Secondary or Oothraangam Hexachord :
<p>Sa and Ma1 (C and F1) are the boundary tones</p>		<p>Pa and Sa2 (G and C 2) are the boundary tones.</p>
<ol style="list-style-type: none"> 1) Out of the 3 kinds of Re take Re 1 (D1) first. Its succeeding 3 tones before Ma 1 (F1) become 3 different kinds of Ga (E) each of which in the order of its rank is combined with Re 1 (D1) individually. Thus there are 3 tetrachordal combinations with Re1 (D1). 2) Leaving Re 1 (D1) take Re2 (D2) next. Its succeeding 2 tones before Ma 1 (F1) become 2 different kinds of Ga (E) each of which in the order of its rank is combined with Re2 (D2) individually. Thus there are 2 tetrachordal combinations with Re 2 (D2) 3) Leaving Re 1 (D1) and Re2 (D2) take Re 3 (D3) at last. Its succeeding 1 tone before Ma1 (F1) becomes the last kind of Ga (E) to be combined with Re 3 (D3). Thus there is 1 tetrachordal combination with Re 3 (D3). 		<ol style="list-style-type: none"> 1) Out of the 3 kinds of Dha take Dha 1 (A1) first. Its succeeding 3 tones before Sa 2 (C 2) become 3 different kinds of Ni(B) each of which in the order of its rank is combined with Dha1 (A1) individually. Thus there are 3 tetrachordal combinations with Dha1 (A1). 2) Leaving Dha 1 (A1) take Dha2 (A2) next. Its succeeding 2 tones before Sa2 (C2) become 2 different kinds of Ni (B) each of which in the order of its rank is combined with Dha2 (A2) individually. Thus there are 2 tetrachordal combinations with Dha2 (A2). 3) Leaving Dha 1 (A1) and Dha 2 (A2) take Dha 3 (A3) at last. Its succeeding 1 tone before Sa2 (C2) becomes the last kind of Ni (B) to be combined with Dha 3 (A3). Thus there is 1 tetrachordal combination with Dha 3 (A3).
<p>Hence altogether there are 6 Tetrachords from the Poorvaangam Hexachord.</p>		<p>Hence altogether there are 6 Tetrachords from the Oothraangam Hexachord.</p>

The above 6 pairs of Tetrachords or Half-scales are now combined with each other as given in the following chart to obtain the Heptonic scales of Melakartha.

Combination CHART for the 72 MELAKARTHAS.

Each of the 6 Primary or Poorvaangam Tetrachords is combined individually with the 6 Secondary or Oothraangam Tetrachords by which a set or Chakram of 6 Heptatonic (seventoned) scales or full octaves called Melakarthis is obtained as follows :

[illegible]

With Re 2 (D 2)

4th Pair	Sa		Re 2	Re 3		Ma 1
				Ga 2		
	C		D 2	D 3		F 1
				E 2		

With Dha 2 (A 2)

	Pa		Dha 2	Dha 3		Sa 2
				Ni 2		
	G		A 2	A 3		C 2
				B 2		

5th Pair	Sa		Re 2		Ga 3	Ma 1
	C		D 2		E 3	F 1

	Pa		Dha		Ni 3	Sa 2
	G		A 2		B 3	C 2

With Re 3 (D 3)

6th Pair	Sa			Re 3		Ma 1
					Ga 3	
	C			D 3	E 3	F 1

With Dha 3 (A 3)

	Pa			Dha 3		Sa 2
					Ni 3	
	G			A 3	B 3	C 2

- NOTE : 1. The 7th tone above is Ma 2 (F2) which is suspended for the present, but substituted later for Ma 1 (F 1) of the same chart by which a second number of 6 pairs of Tetrachords are obtained.
2. Take Sa, Re, Ga, Ma, Pa, Dha and Ni or C, D, E, F, G, A and B of the same kind of printed types for each of the 6 pairs or scales of the above chart and note their positions in each pair or scale.

If each of the 6 Primary or Poorvaangam Tetrachords gives a set or Chakram of 6 Melakarthis, all the 6 of them will give 6 sets or Chakrams of 6 Melakarthis each amounting to $6 \times 6 = 36$ Melakarthis which have Ma 1 (F1) in each of them. If Ma2 (F2) is substituted for Ma 1 (F1), we will have additional 6 sets or Chakrams and 36 Melakarthis. Thus altogether the number of Melakarthis comes to 36 plus 36 (by twice 6 sets or Chakrams) = 72, the traditional South Indian or Karnatic 72 Melakarthis of Venkatamakhi (said to have lived sometime during the 17 th Century in Tanjore) finally nomenclatured (about mid 18 th Century) by *Akalanka Govindhaacharya* of the court of Tanjore in South India.

SPECIAL INTEREST :

(1) 144 Melakarthis

The first 36 of the 72 Melakarthis are made to have Ma 1 (F1) in the ascent and Ma2 (F2) in the descent each; and the second 36 are made to have Ma2 (F2) in the ascent and Ma 1 (F1) in the descent (reversed) each. These give a new number of 72 Melakarthis. Thus the former 72 and this latter 72 give in total 144 Melakarthis.

(2) 108 Melakarthis

In the first 36 of the 72 Melakarthis the Perfect Fifth (Pa or G) is substituted by Ma2 (F2) which according to the 22 Sroothis scale with Sa and Pa (C and G) as changeables (admitting of varieties) is a diminished kind of Pa (G) called VIKRITHA PANCHAMAM. By this procedure another new number of 36 Melakarthis is obtained. Thus the former 72 and this latter 36 give in total 108 Melakarthis.

JANYAMS OR TRANSILIENT SCALES.

A scale in which one or more of the 7 Principal tones are absent either in the ascent or in the descent or in both of them is called a JANYAM or JANYA MELAM or

a **TRANSILIENT** scale. There are more than 30,000 scales of such kind in South Indian music.

Note : Derivation scale, Janyam, Janya Melam, Janya Raagam, Minor Mode, Thiram and Transilient scale are synonymous.

Melakartha - Janyam

Melakartha, Moorechanai and Pann (literally meaning 'that done' in music) are the capital names for a heptatonic (seventoned) scale which is but erroneously called Thiram sometimes.

Janyam and Thiram are the proper names for a transilient scale, called also Pann oftentimes.

Jaathi (not Jadhhi or Jedhi, the name for rhythmic solfa alphabet) is the name for either a heptatonic or a transilient scale and for even a Raagam (tonal-mould) while it is also the name for the Numerical kind that pertains to a Thaalam.

NOTE : Genus - Specie, Heptatonic - Transilient, Janakam - Janyam, Melakartha - Janyam, Pann - Thiram and Raagam - Raagini are synonymous.

DRONE

DRONE in music is the Tonic, Ground-tone or Fundamental against the ambient back-ground of which the South Indian music is sung or played. Drone sustains a tonal centre which is a Reference-tone to compare other tones with and it does not allow its closest tone to sound clearly with it if the closest tone is not oscillated or sounded with gamakam (to eliminate acoustic beats). It is the Melodic 'Centre of Gravity' to which the South Indian melodic termination is attracted.

The chording of the Tonic or the Fundamental (Sa or C) with Pa or G or Ma1 or F1 above or below it and with its upper or lower replica becomes a composite drone which is a later development of the original simple Tonic or the Fundamental.

The drone is of paramount importance to the South Indian (indigenous) music because it is the specific tone by

which its relative tones in the indigenous South Indian JUST INTONATION scale are discriminated readily.

The best drone instrument is the THAMBOORA, a development of the Monochord (Eka Thandhi Vaadhyam) originated from the hunter's bow in South India. This instrument with 4 or 7 strings forming a harmonic reference-frame is the best drone instrument because it possesses rich over-tones or upper-partial tones and is a harmony by itself. Its strings are sounded by digital strokes in a continuous cycle irrespective of time-measure.

Special Interest : DRONE BELL is a tongueless bell of India emitting a definite or invariable pitch when a wooden bit is touchingly rotated along its sound-bow (periphery of its belly).

SOLFA

The word Solfa is an European coinage of the two syllables SOL and FA which stand for Pa (G) and Ma (F) respectively of the European Note-syllables of the scale, Do, Re, Me, Fa, Sol, La, Te or Se. This word originally meant the melodic letters but later-on it came to mean also the rhythmic letters in India.

SOLFA PERCEPTION (SWARA-GNAANAM).

To a common Tonic or Fundamental practise different exercises in different Melakarthas (heptatonic scales) with different kinds (different intervals or distances) of the changeable 5 of the 7 Principal tones with Sa and Pa or C and G having no kinds. Note the differences of the relative tones to the Fundamental then and there.

Bearing in mind that any piece of South Indian music sung or played must terminate on the keytone (Fundamental or Reference-tone), find and keep musing over the keytone while a music is in progression. By comparing the heard-tones with the keytone Solfa-perception (Swara-Gnaanam) becomes possible, although only to some extent at first. By constant such practices any music-minded individual will be able to master the art.

Melodic Solfa singing or Playing (Aavarthana-Swaram Paadoodha' or Vaasithal)

The above is the singing or playing the melodic letters (Swarams) in terms of the counts and beats of parts and wholes of Thaalam. It is an art by itself which generally follows the verbal singing or song playing.

Rhythmic Solfa singing or Playing (Aavarthana-Jadhi Paadoodhal or Vaasithal,

The above is the voicing or playing the rhythmic letters or marks (JADHIS) in terms of the counts and beats of parts and wholes of Thaalam. It is an art by itself which generally follows the verbal singing or song playing.

NOTE :

These melodic and rhythmic solfa singings or playings include elaborate improvisations, syncopations and other such creative performances unlike the miniature ready-made melodic and rhythmic solfa passages called CHITTAI SWARAMS and JADHI SORKALS respectively provided for musical compositions.

Conclusion

Thus the Rhythm and Melody in India are both Absolute as Layam and Raagam (Tonal-mould on imperceptible rhythm) and Applied as Thaalam and Saahithyam (verbal composition).

